EPA'S WATERSHED PLANNING APPROACH FOR THE SECTION 319 PROGRAM

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Watershed Planning Paradigm Shift

- The traditional paradigm for 319, EQIP, etc. has not enabled us to achieve our WQ goals

- Until you have quantitative knowledge of
  - (a) the nature and source of the WQ problem,
  - (b) the pollutant load reductions needed to meet WQS,
  - (c) the BMP's that will achieve that pollutant load reduction,

  you're not ready to implement BMP's that will solve the problem.

  - (unless you are very lucky)

EPA's 319 Funding Guidelines

- **"Incremental Funds" - $100 million/year**
- **Must be used to develop and implement**

WATERSHED – BASED PLANS

that are designed to achieve water quality standards

** Where TMDL's have been developed, the plans incorporate them and go from there

“Watershed-Based Plans”

- Our Section 319 Program and Grants Guidelines Identify 9 Components that must be included in each “Watershed-Based Plan” to restore impaired waters

- Before a State implements a 319 restoration project, it must develop a watershed-based plan

Nine Elements of Watershed Plan

- A. Identification and quantification of causes and sources at the subcategory level (e.g., X dairy cattle, Y acres needing N management, Z miles of streambank needing remediation)
- B. Estimate of needed load reductions, by subcategory, to achieve WQS
- ID BMP's needed to achieve the load reductions, and ID the critical areas for implementing the BMP's

Nine Elements (cont.)

D. Estimate of needed technical & financial resources

E. Information/ Education component

F. Schedule (who does what, when)

G. Description of measurable milestones for implementation

H. Criteria to determine if loadings/ targets are being achieved

I. Monitoring component for above criteria

National Program Goals

- Motivated in part by OMB PART and EPA Strategic Plan, but builds on our previously-adopted watershed-based planning approach

- Remediate (meet WQS) 250 impaired waterbodies by 2008; 700 by 2012

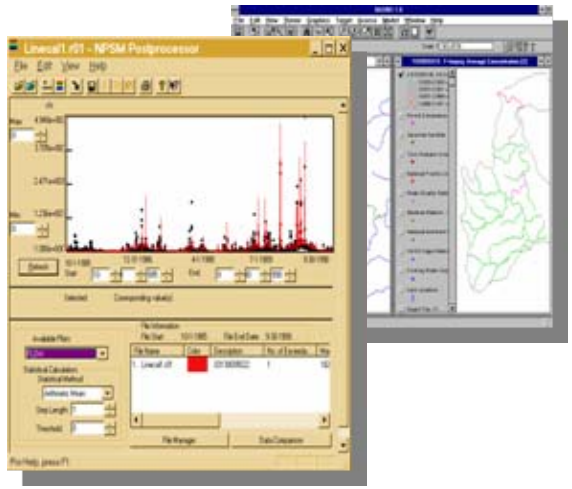
Success Stories Web Site

- www.epa.gov/nps/success
- 26 stories to date
- 14 met WQS
- Other 12 stories had very significant WQ improvements

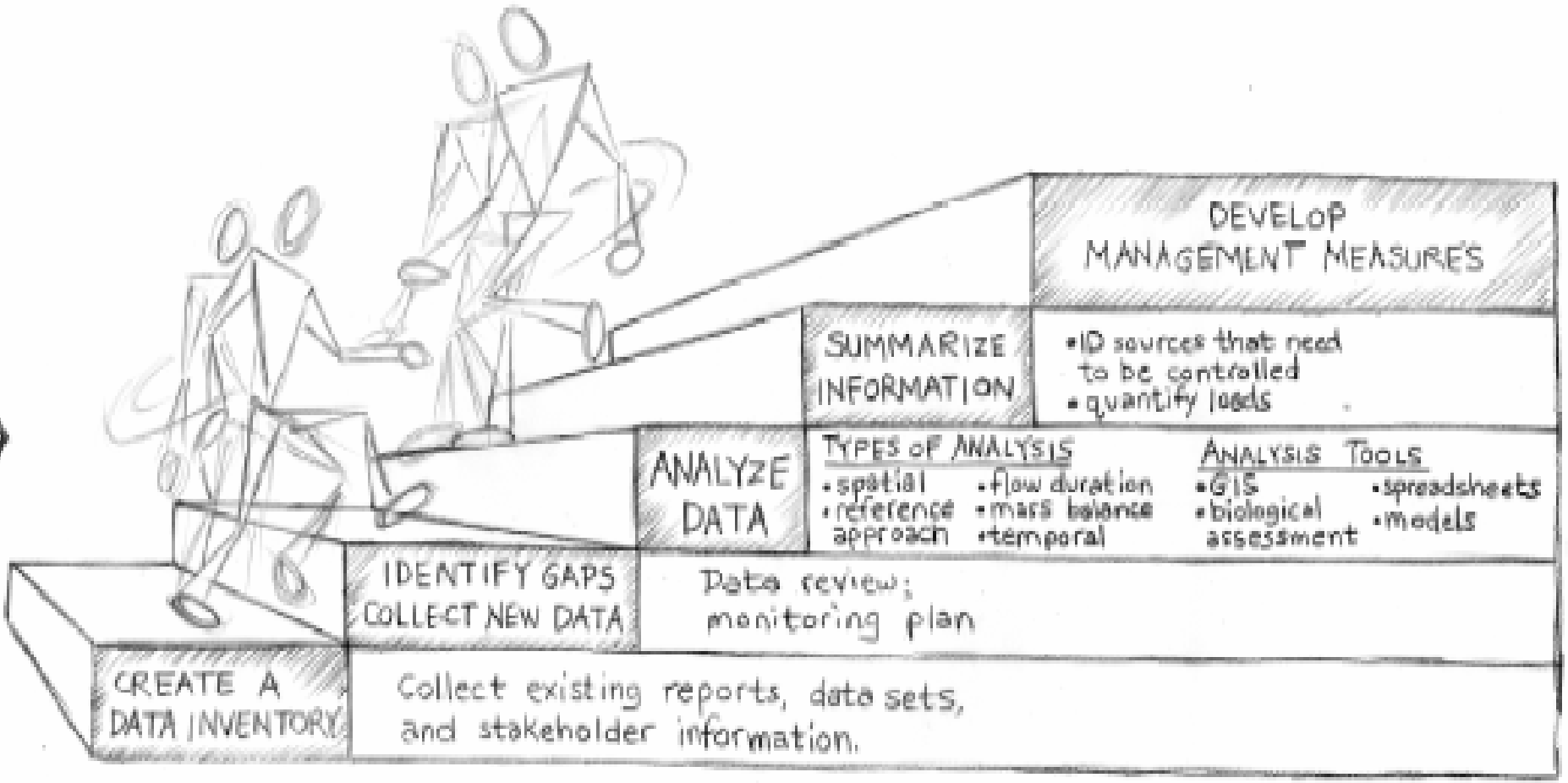
Polished draft to be published this Fall

Technical Analysis Challenges in Planning addressed by our Handbook

- GIS and geographic data
- Statistical interpretation of data
- Modeling and Spreadsheet tools
- Defining the pollution reductions from BMPs for Nonpoint Sources
- Setting up a monitoring program
- Evaluating changes due to management



Water Quality Assessment Steps



Handbook Road Map	
1	Introduction
2	Overview of Watershed Planning Process
3	Build Partnerships
4	Define Scope of Watershed Planning Effort
5	Gather Existing Data and Create an Inventory
6	Identify Data Gaps and Collect Additional Data if Needed
7	**Analyze Data to Identify Causes and Sources**
8	Estimate Pollutant Loads
9	Set Goals and Identify Load Reductions
10	Identify Possible Management Strategies
11	Evaluate Options and Select Final Management Strategies
12	Design Implementation Program and Assemble Watershed Plan
13	Implement Watershed Plan and Measure Progress

7. Analyze Data to Identify Causes and Sources

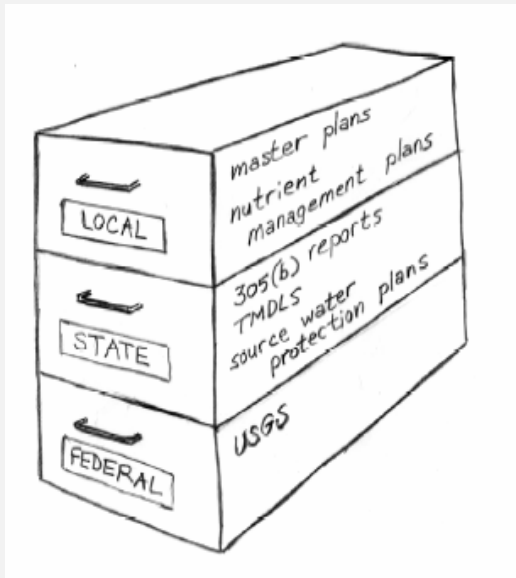
Chapter Highlights

- Identifying locations of impairments and problems
- Determining timing of impairments and problems
- Identifying potential sources
- Determining areas for quantifying source loads

Types of Data for Assessment

Physical and Natural Features

- Watershed boundaries
- Hydrology
- Topography
- Soils
- Climate
- Habitat
- Wildlife



Land Use and Population Characteristics

- Land use and land cover
- Existing management practices
- Demographics

Types of Data (cont.)

Waterbody Conditions

- Water quality standards
- 305(b) report
- 303(d) list
- TMDL reports
- Source Water Protection Areas

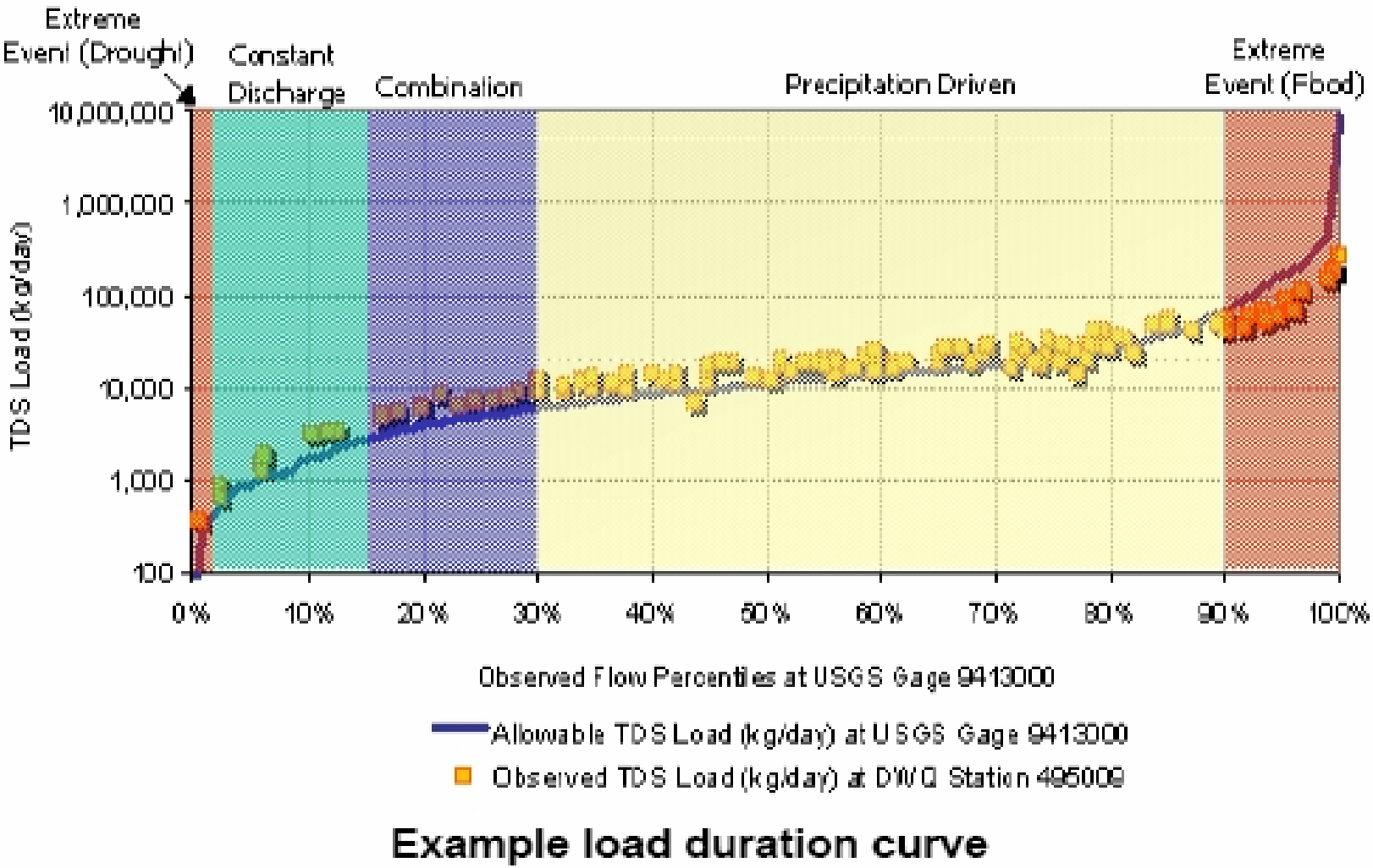
Pollutant Sources

- Point sources
- Nonpoint sources

Waterbody Monitoring Data

- Water quality data
- Flow data
- Biological data

Assessing Critical Flows



Example load duration curve

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9. Set Goals and Identify Load Reductions

Chapter Highlights

- Setting goals
- Identifying management objectives
- Selecting indicators
- Developing targets
- Determining load reductions needed
- Targeting load reductions

From Goals to Management Measures

Preliminary Goal	Indicators	Cause or Source of Impact	Management Objective
Support designated uses for aquatic life; reduce fish kills	Dissolved oxygen Phosphorus Temperature	Elevated phosphorus causing increased algal growth and decreased dissolved oxygen Cropland runoff	Reduce phosphorus loads from cropland runoff and fertilizer application
Reduce flood levels	Peak flow volume and velocity	Inadequate stormwater controls, inadequate road culverts	Minimize flooding impacts by improving peak and volume controls on urban sources and retrofitting inadequate road culverts
Restore aquatic habitat	Riffle-to-pool ratio, percent fine sediment	Upland sediment erosion and delivery, streambank erosion, near-stream land disturbance (e.g., livestock, construction)	Reduce sediment loads from upland sources; improve riparian vegetation and limit livestock access to stabilize streambanks
Meet water quality standards for bacteria to reduce beach closures	Fecal coliform	Runoff from livestock operations, waterfowl	Reduce bacteria loads from livestock operations
Improve aesthetics of lake to restore recreational use	Algal growth, chlorophyll a	Elevated nitrogen causing increased algal growth	Reduce nitrogen loads to limit algal growth
Meet water quality standards for metals	Zinc, copper	Urban runoff, industrial discharges	Improve stormwater controls to reduce metal loads from runoff

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8. Estimate Pollutant Loads

Chapter Highlights

- Load estimation techniques
- Using models for estimating loads
- Available models
- Model selection
- Model application techniques
- Presenting pollutant loads

Which model to chose?

Table 8-8. Application Considerations of the Six Watershed Models

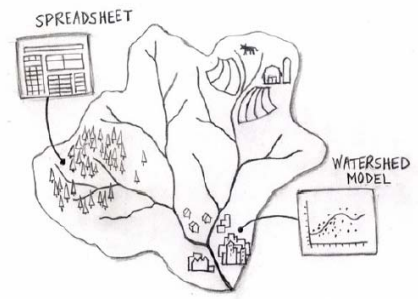
Application Considerations	AGNPS	STEPL	GWLF	HSPF	P8-UCM	SWAT
Experience Required	◗	●	●	–	●	○
Time Needed for Application	◗	●	●	○	●	◗
Data Needs	◗	●	●	○	●	◗
Support Available	◗	○	○	●	○	◗
Software Tools	◗	●	●	●	○	●
Cost to Purchase	●	●	●	●	●	●

Key:

Experience:
- – Substantial training or modeling expertise required (generally requires professional experience with advanced watershed and/or hydrodynamic and water quality models)
- ○ Moderate training required (assuming some experience with basic watershed and/or water quality models)
- ◗ Limited training required (assuming some familiarity with basic environmental models)
- ● Little or no training required

Time Needed for Application:
- – > 6 months
- ○ > 3 months
- ◗ > 1 month
- ● < 1 month

Data Needs:
- ○ High
- ◗ Medium
- ● Low



Support Available:
- – None
- ○ Low
- ◗ Medium
- ● High

Software Tools:
- – None
- ○ Low
- ◗ Medium
- ● High

Cost:
- – Significant cost (> $500)
- ○ Nominal cost (< $500)
- ◗ Limited distribution
- ● Public domain

Data needs for common models

Table 8-9. Typical Data Needs for Example Models

	STEPL	P8-UCM	GWLF	SWAT	AGNPS	HSPF
Number of watersheds	1	1	1	> 1	> 1	> 1
Infiltration parameters based on land use/soils	CN/USLE	CN/USLE	CN/USLE	CN/USLE	CN/USLE	HSPF-specific
Stream channel character-istics	N/A	N/A	N/A	dimensions of stream channel	N/A	Flow/ discharge relationships, length
Nutrient applications	N/A	N/A	Manure/ nutrient applications, date	Application rate	Application rate	Application rate
Management practices	General type	General type	General/ agricultural	Location/ type associated with land use	Location/ type associated with land use	Location/ type

Note: CN = curve number

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11. Evaluate Options and Select Final Management Strategies

Chapter Highlights

- Approaches used to quantify effectiveness of management practices
- Estimating management effectiveness
- Cost considerations
- Evaluating options
- Selecting final strategies

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13. Implement Watershed Plan and Measure Progress

Chapter Highlights

- Creating an organizational structure
- Implementing activities
- Preparing work plans
- Sharing results
- Evaluating your program
- Making adjustments

Monitoring and Evaluation Criteria

Developing Criteria to Measure Progress in Meeting Water Quality Goals

Note: Complete one worksheet for each management objective identified.

Management Objective: Reduce nutrient inputs into Cane Creek by 20 percent

Indicators to Measure Progress	Target Value or Goal	Interim Targets		
		Short-term	Medium-term	Long-term
P load	44 t/yr	52 t/yr	49 t/yr	44 t/yr
# of nuisance algae blooms	0	2	1	0
transparency	5.5 m	4.1 m	4.9 m	5.5 m
frequency of taste and odor problems in water supply	0	1	1	0
hypolimnetic DO	5.0 mg/L	2.5 mg/L	4.0 mg/L	5.0 mg/L

Figure 12-2. Worksheet: Developing Criteria to Measure Progress in Meeting Water Quality Goals.

Watershed Management Decision Support System

Integrated Tools

- Eventually will provide decision support to help users select the most appropriate tool for each step of the watershed planning process

- Data bases – weather, soils, land use, land cover, Existing BMPs, W.Q. (Storet, etc), resource condition, point source info, etc
  - Connect to: GIS – Mapping and Analysis Tools
    - Connect to: Modeling and Data analysis Tools
      - Connect to BMP Efficiency Data and Cost Data
        - Connect to tools to help support WQ Monitoring and Implementation Tracking
        - Plans of appropriate scale, level of detail, and suited to site-specific and local needs.

Decision-Support System

- Not Really a “System” – very flexible, modular, and open to addition/subtraction
- Multiple analytical tools (e.g., a number of models that are similar but have different strengths and weaknesses) and data bases
- Probable paradigm is “Thin Client” using grid computing technology

Examples of Grants to Support Watershed Planning Tools

- **Penn State University** – AvGWLF Model Improvements- Manual + LID tools; model calibration for New England States

- **Virginia Tech** TMDL Support Center – Evaluate stream channel erosion component of AgNPS and compare with SWAT and GWLF in same watersheds (dueling models!)

- **Auburn University**/ TVA Research & Extension Center – SWAT Model improvements to ID &rank contributing areas, & compute BMP impacts

- **Swarthmore College** - Using AvGWLF – urban BMP optimization/prioritization to reduce flow/plts at lowest $

Watershed Tools Training

- Watershed Conservation Resource Center **(WCRC)** in Little Rock, Arkansas
- Water Environment Federation **(WEF)** – Course and Webcasts Training
- Contractor-assisted Training – Soil & Water Conservation Society(**SWCS**) Water Resource Education Network (**WREN**) in Pennsylvania, & in conjunction with **Getting-in-Step**
- USFWS Training Center – Part of 2 Week Course

Our Web-Site is Great!!!!!!!!

- www.epa.gov/owow:
  - Includes watersheds, wetlands, TMDL's,NPS

- www.epa.gov/nps
  - All of our NPS stuff: CZARA MM's and updated National MM's, Watershed planning, Urban/LID, Getting in Step; NPS Outreach Digital Toolbox

Watershed Planning & CZARA

- CZARA's 2 components:
  - Additional MM's to meet WQS
    - Help ID priority areas
    - Help enlist watershed participants – towns, citizens
    - Help integrate coastal WQ data into broader set of local planning decisions
    - Help develop ordinances
    - Help mobilize coastal political leadership

Watershed Planning & CZARA

- g measures
  - Work with cities, town councils, etc., to integrate state-wide planning processes, regulations, permits for urban SW to achieve Urban MM's
  - Join forces with others to promote projects to reverse effects of hydromod (e.g., channelization, river and shoreline destabilization)
  - Join forces with USDA, state Ag agencies, and Conservation Districts re CREP, WRP, CRP

Getting to Full Approval

- Diane Regas memo (10/16/03): Regions may:
  - Include provisions in EPA/State agreements that require States to address conditions
  - Include conditions in 319 grants that require States to take specific steps to resolve remaining issues that currently preclude full program approval
  - Thorough process before taking any disapproval action

Getting to Full Approval

- Feb. 24/05 email from me to Regions
  - Reminded them of Diane's memo
  - Urged the use of the $100K set-aside where needed to meet outstanding conditions